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## Notes on Fishes from Prince Patrick and Ellesmere Islands, Canada

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In 1951 the National Museum of Canada sent Mr. S. D. MacDonald to Alert, Ellesmere Island (latitude 82° 29' N., longitude 62° 15' W.), and in 1952 to Mould Bay, Prince Patrick Island (latitude 76° 14' N., longitude 119° 50' W.), to collect animals. The writer was fortunate in receiving permission from Dr. F. J. Alcock, Chief Curator, Dr. L. S. Russell, Chief of Zoology Section and Curator of Vertebrate Paleontology, and Mr. Sherman Bleakney, Curator of Herpetology and Ichthyology, all of the National Museum of Canada, to examine and report on Mr. MacDonald's valuable fish collections. Dr. C. M. Breder, Jr., permitted the writer to study Mr. MacDonald's specimens in the Department of Fishes and Aquatic Biology of the American Museum of Natural History.

The ichthyofauna of western Arctic Canada has been little studied. In another paper (Walters, 1953) the fishes collected by the Canadian Arctic Expedition and other travelers are reported on. In the present report, seven species are identified from Mould Bay. Of these, three (*Anarhichas denticulatus*, *Lycodes pallidus*, and *Eumicrotremus spinosus*) are new to the Beaufort Sea ichthyofauna.

The following of MacDonald's specimens have been deposited in the collections of the American Museum of Natural History: *Salvelinus alpinus* (four Mould Bay specimens, A.M.N.H. No. 19833), *Boreogadus saida* (six Mould Bay specimens, A.M.N.H. No. 19835), *Lycodes pallidus* (two Mould Bay specimens, A.M.N.H. No. 19834), *Icelus bicornis* (one Alert specimen, A.M.N.H. No. 19592), *Myoxocephalus quadricornis* (10 Mould Bay specimens, A.M.N.H. No. 19836), and *Liparis koefoedi* (two Alert specimens, A.M.N.H. No. 19593).

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The remainder of MacDonald's specimens are in the collection of the National Museum of Canada, Ottawa.

*Salvelinus alpinus* (Linnaeus)

ARCTIC CHARR

Collected at Alert and at Mould Bay.

*Boreogadus saida* appears to form an important part of the summer diet of the Mould Bay charr. Small crustaceans and cods were found in the stomachs of smaller charrs, but larger fishes contained only cods. A charr caught July 10, 1952, and measuring 500 mm. in total fresh length contained about 110 *B. saida* in its stomach; the cods averaged about 50 mm. in length.

The largest preserved Mould Bay specimen, a 340-mm. female (standard length), has 11 vertically ovate diffuse dark blotches (parr marks) along the lateral line; these merge into the color pattern of the back, but their ventral portions are distinct. Extremely large diffuse pale spots lie immediately dorsal to, along, and immediately ventral to the lateral line; these almost equal the eye in size. Light spots are absent from the dorsum, but small light spots (equal to the pupil) are scattered dorso-laterally above the large light spots. The lower half of the body is vermilion-pink.

Gill rakers 26–29 in seven Mould Bay fish; pyloric caeca 43–44 in two Mould Bay fish. Most of the specimens have vomerine and palatine dentition typical for the subgenus *Salvelinus*, but the dentition of the 340-mm. Mould Bay female is intermediate between the dentitions of the subgenera *Cristivomer* and *Baione* (*Salvelinus fontinalis*). In this specimen the vomerine and palatine teeth are in a continuous series as in *Baione*, and the vomer has teeth on a short, posteriorly directed crest as in *Cristivomer*. Pfaff (1937) and Walters (1953) have remarked upon the great dentitional variability in *Salvelinus alpinus* from Arctic America.

*Boreogadus saida* (Lepechin)

POLAR TOMCOD

The polar tomcod was not collected at Alert but was taken often at Mould Bay by MacDonald.

The first specimen was found lying on a mud flat on June 26, 1952; it measures about 115 mm. in standard length. Sixteen juveniles were collected at depths of 75 to 135 feet from July 23 to August 18, 1952; these range from 38 to 76 mm. in standard length.

This was the only identifiable species of fish found in the stomachs of Mould Bay charrs.

*Anarhichas denticulatus* Krøyer

## BLUE CATFISH

According to Jensen (1948), *A. latifrons* Steenstrup is a *nomen nudum*, and the fish previously designated by that name must be called *A. denticulatus*.

A large male was found on the beach at Mould Bay. Its stomach contained the remains of four adult spiny lumpsuckers (*Eumicrotremus spinosus*) and a few small amphipods which may have been in the stomachs of the lumpsuckers.

D LXXXI; A 49 (last two rays counted as one).

Total length	1160 mm.
Standard length	1079
Caudal length	81
Head length	188
Head depth	210
Interorbital	52
Eye width	26
Postorbital head length	138
Snout to center of eye	76
Predorsal length	168
Preanal length	600
Body depth	about 300
Caudal peduncle length	33

The peritoneum is dirty gray. There is no trace of a lateral line. A single stubby pyloric caecum is present.

All the teeth are pointed; there are no molariform teeth. The premaxillary teeth occur as an outer row of large recurved teeth, several of which are caniniform; the last tooth lies beneath the nostril. There are one or two irregular inner rows of premaxillary teeth which are small and sharp; the last tooth lies beneath the anterior edge of the orbit. The mandibular teeth are in one row posteriorly, widening to three rows anteriorly. Mandibular canines are developed opposite the premaxillary canines. The mandibular teeth in the outermost row are larger than the others, except at the symphysis where some small teeth are found. The vomerine teeth extend as far back as do the premaxillary teeth, i.e., to beneath the anterior edge of the orbit; there are two median rows of large blunted conical (not molariform) teeth flanked on each side by a single lateral row of small sharp teeth. The palatine teeth are in two irregular rows on each side, with those in the outer row being the larger. The last palatine tooth lies at a level beyond the middle of the eye but not so far back as the last mandibular tooth, and the length of the palatine rows is about twice the length of the vomerine rows of teeth.

The Mould Bay fish agrees with the figure of *A. latifrons* in Goode and Bean (1895, atlas, pl. 77, fig. 271) and Jordan and Evermann (1896–1900, pt. 4, pl. 346, fig. 845) with respect to fin contours, body depth, and mouth size, but the head is a little more strongly decurved than is indicated in the figure. Jordan and Evermann's figure is the same as the one in Goode and Bean, and thus the difference in head contour appears in both figures. The Mould Bay fish does not resemble the figures of *A. latifrons* in Ehrenbaum (1936, p. 141, fig. 113), Esipov (1949, p. 616), and Berg et al. (1949, atlas, pl. 189). In these cases, *A. latifrons* is shown to have the dorsal fin without a notch in the rear, the maxillary extends far beyond the vertical of the rear of the orbit, and the snout is produced. The fish illustrated by Goode and Bean and by Jordan and Evermann has a notch at the rear end of the dorsal fin, the maxillary ends at the vertical of the rear of the orbit, and the snout is strongly decurved.

It is evident that two forms are currently referred to *A. denticulatus*, but it is not clear whether the situation is one of dimorphism or of two distinct species which are placed together because the palatine tooth rows are much longer than the vomerine rows. Jensen (1948) stated that only one kind of this type of catfish occurs in Greenland waters, but unfortunately he did not illustrate it.

Goode and Bean's and Jordan and Evermann's fish was probably bleached, because the figure does not indicate any dark spots. Although most of the pattern has been bleached out of the Mould Bay fish, diffuse dark spots are visible on the dorsal fin and upper sides; there are no dark bands evident. The fish illustrated by Berg et al. has faint dark bands on its back in addition to dark spots; the "lateral lines" are probably artifacts.

*Anarhichas denticulatus* ranges from Prince Patrick Island eastward to Novaya Zemlya; this type of catfish is probably circumpolar but is ordinarily limited to the deeper waters.

*Gymnelis viridis* (Fabricius)

UNERNAK

One specimen of this circumpolar species was collected at Alert.

*Lycodes pallidus* Collett

PALE EELPOUT

Eight specimens 42–73 mm. in standard length were collected at depths of 100 to 135 feet on July 23 to 27, 1952, at Mould Bay.

The peritoneum is dark-colored and shows through the body wall.



The linings of the mouth and gill chambers are white. The ground color of the body is yellow, with nine to 12 dark bands; the bands have dark edges. The last three or four bands pass onto the anal fin; all of the bands pass onto the dorsal fin.

The lateral line is ventral and ends at about the level of the origin of the anal fin. In some specimens there is evidence of an additional, mediolateral lateral line.

Specimens 54–73 mm. in length are scaled; the 42- and 44-mm. specimens are scaleless.

The pectoral fin is rounded in outline and is not notched.

The cartilaginous combs under the chin have low, rounded tips.

The eight specimens were at first thought to represent a new species, owing to the peculiar translucency of the head (the brain may be seen with transmitted light), but this is probably due to faulty fixation because a similar translucency is noted in some of the Mould Bay *Boreogadus saida*.

	MOULD BAY	LAPTEV SEA <sup>1</sup>	NORTH ATLANTIC AND KARA SEA <sup>2</sup>
Dorsal <sup>3</sup>	98–104	96	94–101
Anal <sup>3</sup>	87– 91	82–83	81– 86
Pectoral	17– 19	15–19	17– 21

The anal fin ray count of the Mould Bay specimens lies beyond the ranges reported by Jensen (1904) and Knipowitsch (1906). This indicates that *L. pallidus* may consist of two or more subspecies, but material from localities throughout the range must be studied before any conclusions may be drawn.

Four of the eight eelpouts were parasitized by copepods (Crustacea); two fishes had two copepods apiece and two had only one parasite. In each case the copepod was attached to the fish's cheek, at the level of the infraorbital lateralis canal below the posterior edge of the pupil. At the site of attachment the host skin was thickened and exhibited a small circular dark area. The copepods did not penetrate through the skin into the transparent gelatinous connective tissue beneath. The method of attachment, by means of the maxillae, and the possession of well-developed maxillipeds place the parasites as representatives of the Lernaeopodidae. They belong in the group of genera *Clavella-Clavelloopsis-Clavellisa-Clavellodes* as distinguished by Wilson (1915). The six speci-

<sup>1</sup> Data from Knipowitsch (1906) for *L. attenuatus*, which is at most a local form of *L. pallidus*, according to Andriashev (1939).

<sup>2</sup> Data from Jensen (1904) for *L. pallidus*, *L. pallidus* var. *similis*, and *L. pallidus* var. *squamiventer*.

<sup>3</sup> The dorsal and anal fin ray counts each include one-half of the caudal fin.

mens are immature females; no dwarf males were found. The parasites are deposited in the National Museum of Canada.

*Icelus bicornis* (Reinhardt)

TWO-HORNED SCULPIN

The Alert material consists of one young male, two juveniles, and six postlarvae; the Mould Bay material consists of two adult females and seven juveniles. All the Alert and Mould Bay material is referred to *I. bicornis* because the young Alert male has a typical *I. bicornis* urogenital papilla; the two Mould Bay females have microscopic spines distributed on the lateral line plates as described by Jensen (1949) for *I. bicornis*; and the lateral line ends on the caudal peduncle in the male and two females, which is the usual situation in *I. bicornis* (Jensen, 1949).

The juveniles, although lacking lateral line plates and urogenital papillae, are assigned to this form because they were collected either with the adults or from near-by localities, and they agree with the adults in pectoral ray counts and in the cranial cirri. The six Alert postlarvae are assigned to *Icelus* because the parietal spines are doubled; they have been arbitrarily identified as *I. bicornis*. The postlarvae range from 14 to 16 mm. in standard length and the vertical fins are continuous; fin counts were not made since not all of the elements are formed at this size.

The top of the head bears two pairs of cirri in the juveniles and adults; the first is located above and behind the eye (postorbital cirrus) and the second is located on the anterior parietal spine (parietal cirrus). The postorbital cirrus is simple in a 22-mm. Alert juvenile but compound in the others. The parietal cirrus is simple in all specimens.

Fin counts of Alert and Mould Bay fishes: D<sub>1</sub> VIII–X (seven specimens); D<sub>2</sub> 18–19 (seven specimens); A 13–14 (seven specimens); P<sub>2</sub> I, 3 (12 specimens). The last two rays of the second dorsal and anal fins are counted as one.

	PECTORAL RAYS	
	16	17
Alert	3	0
Mould Bay	5	4
	—	—
Total	8	4

Jensen (1949) gave the number of pectoral rays as 17–19 for Greenland *I. bicornis* but gave neither a frequency distribution nor the localities from which the specimens came. Vladykov (1933) gave the counts

of Hudson Bay *I. bicornis* as 16 (1), 17 (2), 18 (2), 19 (1), but it is not certain whether Vladykov's specimens were *I. bicornis* and/or *I. spatula*, since no males were present and the character of the lateral line plate spines was not recognized until Jensen (1949) pointed it out.

Sculpins inhabiting the waters of the Canadian Archipelago appear to have a lower pectoral ray count than Greenland fishes and perhaps Hudson Bay fishes, but more material from additional localities is needed before any definite conclusions can be reached.

*Icelus ?spatula* Gilbert and Burke

TWO-HORNED SCULPIN

Recently Jensen (1949) showed that *Icelus spatula* occurs in the waters of West Greenland. This was the first time that the species had been recorded in North America east of the Bering Sea. Previous records of *I. bicornis* should be scrutinized because there undoubtedly has been confusion between the two species.

Walters (1953) listed *I. bicornis* from Cockburn Point, west of Cockburn Point, and Bernard Harbor, Northwest Territories (Dolphin and Union Strait). Only two small Bernard Harbor specimens, a 13-mm. postlarva and a 24-mm. juvenile, were examined. The other specimens collected by the Canadian Arctic Expedition, a 59-mm. female, a 40-mm. male, and two juveniles, could not be found. Mr. Frits Johansen had identified all of the material as *Icelus bicornis* (Reinhardt) (*I. hamatus* Krøyer) in his unpublished manuscript concerning the fishes collected by the Canadian Arctic Expedition and the fishes of Arctic America in general. This identification became doubtful when MacDonald's Alert and Mould Bay collections were examined by the writer. Mr. Sherman Bleakney kindly lent the writer the portion of Johansen's manuscript concerning *Icelus bicornis*. After a critical reappraisal of Johansen's statements, it was concluded that the "*Icelus bicornis*" collected by the Canadian Arctic Expedition and reported by Walters probably contained some *Icelus spatula*.

Johansen did not realize that the form of the male urogenital papilla is of taxonomic importance, since he believed that *I. bicornis* occurs in the Bering Sea. Jensen (1949) said that *I. bicornis* does not occur in the Pacific but *I. spatula* does. Johansen did not mention *I. spatula* in his manuscript.

In the urogenital papilla of the male *I. bicornis*, the terminal portion is almost straight, joins the basal portion at an obtuse angle, and is almost as long as the basal portion. The urogenital papilla of *I. bicornis* is therefore rather long. The terminal portion of the urogenital papilla

of the male *I. spatula* is much shorter than the basal portion and is closely applied to the basal portion; the urogenital papilla of *I. spatula* is therefore shorter than in *I. bicornis*. MacDonald's 36-mm. male from Alert (A.M.N.H. No. 19592) has a urogenital papilla 4.5 mm. long, and a 43-mm. male *I. bicornis* from Karna, Greenland (A.M.N.H. No. 4966), has a urogenital papilla 6 mm. long; the papilla length is contained in the standard length 8 and 7.2 times in the two males. The 40-mm. Cockburn Point male is said to have had a urogenital papilla 3 mm. long, and thus it was contained 13.3 times in the standard length of the fish. Although Johansen did not describe the form of the urogenital papilla of the male from Cockburn Point, the small size of the papilla indicates that it was of the *I. spatula* form.

*Icelus spatula* has a complete lateral line and *I. bicornis* usually has an incomplete lateral line (Jensen, 1949, illustrated and described a complete lateral line in some large West Greenland fishes). Johansen did not state in so many words whether the lateral line was complete in the Dolphin and Union Strait adults, but he did state the following about the 59-mm. female: "The line of bony tubercles (prickles) along the dorsal side begins below the middle of the first dorsal fin and is continued to the narrowest part of the caudal peduncle; these tubercles are smaller and less distinct than the row of bony plates covering the lateral line in its full length." The description fits *I. spatula* better than *I. bicornis*.

Johansen made no mention of cirri in his descriptions of the Canadian Arctic Expedition specimens, and the writer did not find cirri in either of the Bernard Harbor specimens. Although absence of cirri does not identify the specimens as *I. spatula*, it does indicate that they are not the same kind of fish as *I. bicornis* from Alert and Mould Bay. Dr. Richard Backus (*in litt.*) writes that he did not notice any cranial cirri in Labrador specimens of *I. spatula*.

The fin ray counts of the Dolphin and Union Strait fishes are at variance with fin counts of Mould Bay and Alert fishes:

	D <sub>1</sub>	D <sub>2</sub>	A	P <sub>1</sub>	
Dolphin and Union Strait <sup>1</sup>	IX-XI	18-20	14-18	18-19	<i>I. ?spatula</i>
Mould Bay-Alert	VIII-X	18-19	13-14	16-17	<i>I. bicornis</i>
26 mm. Cockburn Point <sup>1</sup>	IX	19	12	15	<i>I. ?bicornis</i>

The anal and pectoral fin counts of the 26-mm. Cockburn Point speci-

<sup>1</sup> Data from Walters (1953) for *I. bicornis*; the second dorsal and anal counts do not include the last ray.



men are not in agreement with the counts for the three other Dolphin and Union Strait fishes and lie closer to the anal and pectoral counts of the Mould Bay and Alert fishes. Walters (1953) considered Johansen's counts of this specimen doubtful, but in view of the range for Mould Bay and Alert fishes, it is possible that this specimen was *I. bicornis*.

*Myoxocephalus quadricornis* (Linnaeus)

FOUR-HORNED SCULPIN

Two juveniles were collected at Alert and 30 juveniles and adults were collected at Mould Bay. *Myoxocephalus quadricornis* and *Icelus bicornis* range farther north than any other known coastal cottids. *Icelus bicornis*, *Triglops pingeli*, and *Cottunculus sadko* are found almost as far north or farther north, but in deep waters (360–698 meters).

*Myoxocephalus quadricornis* is a circumpolar species characteristic of river mouths, bays, and coastal waters of low salinity. It is a shallow-water species in the arctic and is the only sculpin commonly found in tide pools. The Mould Bay localities were: at the mouth of a melt stream flowing into the bay (three juveniles, July 1), in tide pools (26 juveniles and adults, July 7), and in 3 feet of water (one adult, July 10).

The stomachs of six of nine Mould Bay adults contained remains of annelids, fish eggs, and small crustaceans; three of nine stomachs were empty.

	MOULD BAY	ALERT	TOTALS
D <sub>1</sub>			
VII	2	0	2
VIII	20	2	22
IX	1	0	1
D <sub>2</sub> <sup>1</sup>			
11	1	0	1
12	5	0	5
13	10	0	10
14	7	2	9
A <sup>1</sup>			
12	1	0	1
13	6	1	7
14	13	1	14
15	3	0	3
P <sub>1</sub>			
15	7	0	7
16	13	2	15
17	3	0	3

<sup>1</sup> Last ray not counted.

Sabine (1821)<sup>1</sup> described *Cottus polaris* from the coast of North Georgia. Jordan and Evermann (1896–1900, pp. 1996, 1998–1999) referred Sabine's species to *Porocottus* Gill, their reasons being that *Porocottus polaris* has four spines on the opercle (gill cover), the lower jaw is included, and the lateral line gives off pairs of diverging branches with pores at their ends. This is the only record of *Porocottus* in the Arctic. *Cottus polaris* has also been regarded as identical to *Icelus bicornis* (*I. hamatus*) by several authors. However, *Cottus polaris* must be regarded as identical to *Myoxocephalus quadricornis* for the reasons presented below.

Sabine did not furnish an illustration of *Cottus polaris*. Richardson (1855) reported that specimens of *Cottus polaris* could not be located by him. Most of the characters listed by Sabine for *Cottus polaris* are shared by juvenile *Myoxocephalus quadricornis*; both have four strong preopercular (gill cover) spines, the pectoral fins in both are larger than in *Cottus gobio*, both have the upper jaw longer than the lower, and both have the lateral line furnished with a series of small backward-directed tubercles or pores. Sabine's description of the color pattern, light with clusters of minute dusky dots, does not furnish any clear idea of the color pattern of the species. Sabine's figures for the fin counts (D 6, 13; P 15; V 5; A 14; C 14) agree with counts of *M. quadricornis* for the soft dorsal, pectoral, and anal fins (see above). The count of six spines in the dorsal fin is close to the normal range for *M. quadricornis*, and Sabine may have overlooked the minute last spine, and/or the first spine, which is frequently closely applied to the second. Walters (1953) found one out of 53 *M. quadricornis* with six spines. Sabine's figure of five pelvic elements is not in agreement with *M. quadricornis* which has four elements (one spine and three rays), but Sabine may have counted a divided ray as two. The size given for *Cottus polaris* by Sabine (largest specimen less than 2 inches long) and the habitat (tide pools and mouths of small rivulets) are typical of juvenile *M. quadricornis*. Pfaff (1937) found four-horned sculpins (*Oncocottus quadricornis*) at

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<sup>1</sup> Sabine's report is generally regarded as having first been published in 1824, as follows:

A supplement to the appendix of Captain Parry's voyage for the discovery of a north-west passage, in the years 1819–20. Containing an account of the subjects of natural history. In Parry, William, Journal of a second voyage for the discovery of a north-west passage from the Atlantic to the Pacific; performed in the years 1821–22–23, in His Majesty's Ships Fury and Hecla. London, John Murray, pp. ccxi–ccxiv (fish).

However, Sabine's report on the zoology was first published in 1821 (see Sabine, 1821, in Literature Cited). The two papers are identical, save for the pagination.

Chesterfield Inlet, Vansittart Island, Danish Island, and King William Island, but Sabine identified *Cottus quadricornis* only from Melville Island where two specimens 5 to 6 inches long were collected. It is evident that Sabine believed juvenile and near-adult four-horned sculpins to belong to different species, and *Cottus polaris* Sabine (1821) must be placed as a synonym of *Myoxocephalus quadricornis* (Linnaeus, 1758).

Ross (1835) found *C. polaris* to be abundant in tide pools, near river mouths, and fresh-water streams on the east side of Boothia and noted that the fishes seldom exceed 2 inches in length. Pfaff (1937) reported the four-horned sculpin from several places in and near Boothia. The fin counts of *C. polaris* listed by Ross (P 15, V 5, A 15, D 8, 13, C 12 to 14) fit *M. quadricornis* better than do Sabine's counts, but again there is the difference in the number of ventral elements. The writer believes that Ross may have committed the same error that Sabine did.

*Cottus polaris* has been regarded as a synonym of *Icelus bicornis* by several authors, but it cannot be identified with either *I. bicornis* or *I. spatula*, because both of these species have a much greater number of rays in the second dorsal fin (18–20, compared to 11–14 for *M. quadricornis* and 13 for *C. polaris*) and a greater number of spines in the first dorsal fin (eight to 11, compared to six to nine in *M. quadricornis* and six to eight in *C. polaris*). It is unlikely that Sabine and Ross would have overlooked the well-developed double parietal spines if *C. polaris* were identical to a species of *Icelus*, since these are present even in the postlarvae; *M. quadricornis* does not possess pronounced frontal and parietal spines in small juveniles. In addition, *Icelus* is not found in brackish waters but *M. quadricornis* is.

### *Eumicrotremus spinosus* (Müller)

#### SPINY LUMPSUCKER

Three postlarvae, 11–13 mm. in standard length, were dredged in 80 feet of water at Mould Bay on August 18, 1952. Fragments of three adults and a fairly good specimen of a fourth were found in the stomach of a blue catfish (*Anarhichas denticulatus*) which had washed ashore at Mould Bay. The almost entire specimen is a female 84 mm. in standard length. The three other adults were of about the same length, to judge from the sizes of their tubercles.

In each of the seven specimens there is one pair of tubercles between the dorsal fin bases, and in the four adults the right and left tubercles are in contact at their bases. The chin and pectoral fin bases are covered with tubercles in the intact female. In the four adults there are two tubercles in contact with the base of the first dorsal fin on each side.

The tubercles are small and hence widely separated in the postlarvae, but the specimens are assigned to this species rather than to *E. derjugini* because there are two tubercles at the junction of the first dorsal fin with the body on each side (as in the four adults), and there are indications of tubercles developing on the chin. As pointed out by Dunbar (1947), the fleshy first dorsal fin may be a postlarval or juvenile trait of *E. spinosus*, although it is an adult character of *E. derjugini*. An occasional adult *E. spinosus* has a fleshy first dorsal fin (Jensen, 1944, fig. 10) but also has bony tubercles at the base of the fin (in this case, three instead of the usual two); in most adults the rays are clearly discernible. The color pattern of the three postlarvae compares favorably with the color pattern of a 13-mm. specimen illustrated by Jensen (1944, fig. 11), but color pattern cannot be used to distinguish between the young of *E. spinosus* and *E. derjugini*.

*Eumicrotremus spinosus* ranges from Prince Patrick Island eastward to the Barents Sea and may occur in the Kara Sea (see below, under *E. birulai*); it is probably circumpolar in deep waters.

*Liparis koefoedi* Parr

GELATINOUS SEASNAIL

Seven specimens were collected at Alert. One specimen was found in the stomach of a tern, indicating that *L. koefoedi* frequents shallow waters. The other specimens were dredged in about 50 feet of water.

D 47 (4), 48 (1), 49 (1); A 39 (1), 40 (2), 41 (2), 42 (1); P 37 (1); pyloric caeca 23 (1), 25 (1).

The peritoneum appears uniformly black through the body wall, but is densely black-flecked when the lining of the body cavity is examined under low magnification. A black longitudinal stripe, running on the body musculature along the bases of the dorsal rays, shows through the jelly and skin. The skin is very thin, almost like tissue paper, and is underlain by a thick layer of clear, colorless jelly.

*Liparis ?liparis* Linnaeus

NORTHERN SEASNAIL

Two small individuals were collected at Alert.

NOTES ON *Eumicrotremus* IN THE ARCTIC

The following forms are listed from Arctic waters: *E. spinosus* (Müller), *E. birulai* Popov, *E. derjugini* Popov, and *E. spinosus variabilis* Jensen. Only two of these, *E. spinosus* and *E. derjugini*, are well established.



*Eumicrotremus spinosus* (Müller)

## SPINY LUMPSUCKER

*Eumicrotremus spinosus* is replaced by *E. orbis* in the Pacific. The two cannot be considered conspecific because: (1) in *E. orbis* the anus lies close to the posterior border of the sucker but in *E. spinosus* it lies midway between the posterior border of the sucker and the origin of the anal fin; (2) *E. orbis* has two pairs of tubercles between the dorsal fin bases and *E. spinosus* has only one pair (this may not be a valid specific difference; see Vladykov, 1933, p. 22). Jensen (1944) for some unexplained reason considered *E. orbis* (Günther) and *E. pacificus* Schmidt to be identical. To judge from plates and descriptions of the species, *E. pacificus* is a highly distinctive member of its genus. It is the only species with black spots on its body, and it has a huge, sickle-shaped, fleshy first dorsal fin which, when depressed, reaches beyond the origin of the second dorsal fin (Schmidt, 1904, pp. 151, 154–158, fig. 9a–e on p. 157, pl. 5, fig. 2a–c; Popov, 1930; Taranetz, 1937). *E. orbis* and *E. pacificus* have not been reported from Arctic waters.

Popov (1933) listed *E. birulai* from the Kara Sea on the basis of seven young specimens; the inclusion of this species in his list of the fishes of the Laptev, East Siberian, and Chukchi seas is therefore in error. To judge from figures of *E. birulai* in Taranetz (1937, fig. 74), juveniles of this species might easily be mistaken for *E. spinosus* or vice versa because the adults are similar. *E. birulai* is otherwise an Okhotsk Sea species, and the Kara Sea record seems strangely out of place. Popov's material may have been young *E. spinosus*.

*Eumicrotremus derjugini* Popov

## LEATHER-FIN LUMPSUCKER

This species was described by Popov (1926) from the Barents and Kara seas. Popov (1930, 1933) recorded it from the Laptev Sea (Nordenskiöld Sea) and noted that it occurs in the Sea of Okhotsk. Vladykov (1933) listed it from Hudson Bay. Although Schmidt (1950) included Greenland and Iceland in the range of *E. derjugini*, Jensen (1944) made no mention at all of *E. derjugini* from Greenland waters. Instead, Jensen named a new subspecies, *E. spinosus variabilis*, from northeastern and northwestern Greenland.

A comparison of Jensen's figures (1944, fig. 13; pl. 7, figs. c–d; pl. 8, figs. a–d) with Popov's figures of *E. derjugini* (1926, pl. 2, figs. 4–6) fails to disclose any significant differences between the two forms, and Jensen's diagnosis of *E. s. variabilis* does not distinguish the fish from

*E. derjugini*. *E. derjugini* is characterized by the absence of bony tubercles from the chin and frequently also from the pectoral fin bases, the first dorsal fin is covered by flesh and muscle, and there are no bony tubercles at the base of the first dorsal fin. Jensen's material of *E. s. variabilis* consisted of four forms (a, b, c, d) plus a fifth. The color pattern of the small d individual (pl. 8, b) is similar to the pattern in *E. spinosus* postlarvae. Forms a, b, c, and d have a fleshy first dorsal fin, there are no tubercles at the base of the first dorsal fin, the tubercles on the head and body are few in number and small in size, and the chin and pectoral fin bases lack tubercles; these are all characteristic of *E. derjugini*. *Eumicrotremus spinosus variabilis* Jensen (1944) must be regarded as identical to *Eumicrotremus derjugini* Popov (1926).

Jensen identified as *E. spinosus variabilis* a lumpsucker found on the ice at Maroussia near "Danmark's harbor" (northeast Greenland); in the illustration (fig. 14) the first dorsal fin is shown not to be fleshy, there are six tubercles in contact with its base, and the edge of the fin bears a row of tubercles. According to Jensen, the head and body tubercles are distributed as in typical *E. spinosus* except that the tubercle behind the first dorsal fin is small, is not in contact with its partner, and is situated farther down on the side of the back. This fish cannot be placed in *E. derjugini* and should be regarded for the present as an aberrant *E. spinosus*. It cannot be called *E. spinosus variabilis* because the specimens on which Jensen based his description of the form have been shown to be *E. derjugini*.

*Eumicrotremus derjugini* undoubtedly occurs in western Arctic America, but there appears to be no definite record for it.

## SUMMARY

1. The following fishes were collected:

ALERT	MOULD BAY
<i>Salvelinus alpinus</i>	<i>Salvelinus alpinus</i>
<i>Gymnelis virdis</i>	<i>Boreogadus saida</i>
<i>Icelus bicornis</i>	<i>Anarhichas denticulatus</i>
<i>Myoxocephalus quadricornis</i>	<i>Lycodes pallidus</i>
<i>Liparis koefoedi</i>	<i>Icelus bicornis</i>
<i>Liparis ? liparis</i>	<i>Myoxocephalus quadricornis</i>
	<i>Eumicrotremus spinosus</i>

2. Two different forms of catfish are currently referred to *Anarhichas denticulatus*, but it is not known whether the differences are due to sex, age, or other factors, or whether or not the differences are specific.

3. The specimens of *Icelus bicornis* listed by Walters (1953) from various stations in Dolphin and Union Strait, Northwest Territories, probably consisted at least in part of *Icelus spatula*; one specimen may have been *Icelus bicornis*.

4. *Cottus polaris* Sabine (1821) and *Porocottus polaris* (Sabine) Jordan and Evermann are identical to *Myoxocephalus quadricornis* (Linnaeus).

5. *Eumicrotremus pacificus* Shimdt is not identical to *E. orbis* (Günther).

6. The record of *Eumicrotremus birulai* from the Kara Sea (Popov, 1933) should be regarded as probably *E. spinosus*.

7. *Eumicrotremus spinosus variabilis* Jensen (1944) is identical to *E. derjugini* Popov (1926).

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